

Application SN 10/072,380
Amendment Dated: 12/19/03
Reply to Office Action of: August 27, 2003

REMARKS

The objection to the drawings and specification have been noted. The helpful comments of the Examiner with regard to the drawings and specification are noted and these changes are incorporated by this Amendment and are believed to obviate these objections.

The changes mainly correct minor numbering inconsistencies which primarily relate to the environmental structure of a stern drive unit and are not believed to constitute new matter.

The objection to the specification under 37 C.F.R. §1.71 and §1.75 (d)1 regarding the basis for material set forth in Claim 5 has been noted. The references to 4140, 4130, etc., refer to well-established designations for various compositions of steel. However, Claim 5 has been amended to recite the support is fabricated from either chrome moly steel or stainless steel as disclosed in the specification. The Examiner's attention is directed to the accompanying exhibit, which is a standard reference, *The Ryerson Steel handbook*, Copyright 1995, which was in effect as of the date of filing and which set forth a description of these specifications.

Turning now to consideration of the claims, Claims 1 to 10 have been rejected under 35 U.S.C. §102 on the basis of the prior patents to Mixer, Clark, Travis and Payne.

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Claim 1 is a single, independent claim presently before the Examiner as Claim 11 is drawn to a method and has been withdrawn from consideration.

At the outset, a review of the applicants' invention is believed helpful. The Applicants' invention is a drive shaft support which is installed in the upper case housing in a stern drive unit. The support receives the vertical drive shaft as well as the bearing and clutch assembly. Stern drive units for marine applications are well-known and these units are represented by the stern drive units manufactured by Mercury Marine. The stern drive generally consists of an upper gear housing which mounts to the transom of a boat. The lower gear housing is attached to the lower end of the upper gear housing. A propellor shaft is supported in bearings in the lower gear housing and is driven by a vertical drive shaft extending from the upper housing to the lower housing powered by an inboard engine through an upper gear and clutch assembly in the upper housing.

A problem with stern drives of the general type described above is that their power transmission capability is limited. Even under ordinary operating conditions, damage to the drive shaft may result, which damage can be expensive to repair. The attached Declarations, which were filed in the parent case, now U.S. Patent No. 6,491,588, are incorporated by reference. As reflected in these Declarations, boat enthusiasts have long been seeking ways to modify the transmission of stern drive units so the units can handle increased horsepower. Further, boat operators have been seeking

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ways in which to modify stern drive units to increase their reliability and power transmission capacity. The Applicants, as a result of their extensive experience and training in the field of marine drive units, became aware of the problem with units such as the Bravo unit manufactured by Mercury Marine. The failure problems of these units are well documented and known to those in the field.

Briefly, the present invention is a support for the vertical drive shaft and related components such as the upper gear and clutch bearing assemblies of the stern drive unit. The support of the present invention significantly reduces vibration of the upper shaft, upper gear and clutch. The support also reduces upper case fatigue and facilitates greater torque transfer. The support of the present invention replaces the existing OEM components in the upper case housing. The support includes a vertically extending tubular member having a bore which receives the drive shaft. The support is held in place by a pair of opposed retainers on the tubular body which may be in the form of flanges. One or both of the opposed retainer members may be axially adjustable along the tubular body. Adjustment may be achieved by threaded engagement between the body and retainers. This allows the retainers to be axially adjusted so the retainers may be tightened to bring the retainers into engagement with engagement surfaces of the upper housing to secure the support in place. Additional apertures for an anti-rotation setscrew and ports for lubrication may also be provided in the support structure.

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The tubular body of the support has a taper extending into the bore at the upper end. A bearing member, such as a roller or needle bearing, is pressed or otherwise secured within the upper end of the tubular member to support the shaft within the bore for rotation and to support other components connected to the drive shaft. The drive shaft support is inserted into the stern drive unit by removing the top cover of the unit to provide access to the vertical shaft. Existing components such as the drive shaft and upper gear assemblies are removed and some modification and machining of the housing may be required to accommodate installation of the support.

After modification, the support is installed and extends the *entire length* of the upper housing. Once inserted, the support is secured by adjusting one or both of the retainers to apply a clamping force against abutting surfaces in the upper case.

The drawings, as for example Figure 1, clearly illustrate the support extending the full length of the upper housing. The upper end of the support may be secured against rotation by inserting a fastener such as a setscrew through a bore in the upper retainer.

The drive shaft and other components, such as the clutch assembly, bearings, top cover and the like, can then be installed. The drive shaft extends vertically through the bore in the support and is coupled to the upper drive shaft which carries the clutch and gearing.

Claim 1 is a single, independent claim under consideration and specifies a fixed support for the drive shaft and components which attach to the drive shaft, such as the

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upper gear clutch and bearing assemblies. Claim 1 also specifies the support has an elongate body with a central bore which extends essentially the entire vertical length of the upper gear housing and is secured in the upper housing by the above-described retainers. Thus, the claim is directed to a fixed drive shaft support in the specific structural environment of a stern drive unit.

The patent to Mixer relates to a pipe coupling having coupling plates which are screwed upon the ends of a section of pipe. A lead washer is interposed between the flanges which is secured by bolts to press the washer in the grooves between the coupling ends. The Examiner states that Mixer illustrates an upper gearset support and that Figure 2 shows the upper gearset support further comprising a first retainer A on the left end of the right element B and a second retainer of the element A on right end of the right element B. Applicants respectfully submit that Mixer does not show a gearset but rather a plumbing or pipe coupling fixture. Further, while the retainers of the patentee may be screwed onto the pipes, they are not axially adjusted relative one to another to secure the pipe fitting in place. Rather, securement is by means of bolting to an adjacent flange.

Clark also shows a pipe fitting quite similar to Mixer. The heavy flange and box fittings have engaging surfaces which consist of interfitting male and female parts which when secured by clamping bolts will be pinched together for a tight fluid seal.

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Travis has been cited in support of rejection to Claims 1 to 3 and 10 under 37 U.S.C. §102 as showing an upper gearset dimensioned to extend substantially the length of the upper case body. Again, Applicants respectfully submit that Travis does not show an upper gearset but rather shows a pipe connect having a variable radial connector to join a pair of bell end fittings.

Several comments apply with respect to all of these references discussed above. Firstly, the Applicants' invention relates to a support designed for the specific environment of a stern drive unit. None of the references above relate to stern drive units, but rather relate to plumbing fixtures, mainly pipe fittings and pipe connectors of different types. As such, the references do not appreciate, nor are they directed to the problems solved by the Applicants' invention. For example, none of the references above are for the support of a power transmission component such as a drive shaft rotated within the support. Rather, plumbing fixtures are for securing a fluid-type joint. Applicants also emphasize the introductory or preamble of the Applicants' Claim 1 sets forth the environmental setting of the support.

Further, the above references were also cited under 35 U.S.C. §102, which defines lack of patentability for lack of novelty or anticipation. In order for prior art to anticipate under this section, every element of the claimed invention must be identically disclosed, either expressly or under principals of inherency in a single reference. *Glassworks vs.*

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Sumitomo Electric, 9 USPQ 2d 1962, 1965 (Fed.Cir.1989) The exclusion of a claimed element, no matter how insubstantial from a prior reference, is enough to negate anticipation.

Note that the Applicants' Claim 1 specifies that the upper end of the support is internally configured to receive the upper gearset and clutch assemblies. No such feature is found in the above prior art references.

Claims 1, 2, 5, 8, and 10 have been rejected under 35 U.S.C. §102(e) as being anticipated by Payne. While the reference to Payne, U.S. Patent No. 6,254,443, does relate to a marine drive shaft support, reference is made to the Declaration of Aaron C. Mansfield. It will be seen that the present invention is based on a provisional application originally filed November 9, 1999. Payne was cited as a reference against the Applicants' parent application now U.S. Patent No. 6,491,588. It is submitted the Payne reference is not a proper reference against the present invention as clearly the Applicants were in possession of the whole invention as claimed well prior to the effective date of the Payne reference. The main differences between the claims of the issued patent and the present application is the support can be secured by axial adjustment of either or both retainers on the body.

Notwithstanding the inapplicability of the Payne patent as a reference, it is submitted the Applicants' present invention is nevertheless distinguishable over Payne.

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The Applicants' support is shown and claimed as extending *substantially the entire length of the upper gear housing* and is secured adjacent the lower end by retainer members which engage surfaces in the upper housing. One or both of the retainers are adjustable to provide a clamping retention force.

5 In review of Payne, Payne does not suggest an elongate support extending the length of the upper case, rather it is best understood the Payne support extends only a short distance into the upper housing and appears to be secured only at the upper flange or is secured in grooves in the housing by press fitting, threading it into grooves or some type of nut and bolt construction. Thus, the relatively short axial length of the Payne
10 support would not effectively operate to provide the support for the drive shaft. Applicants' full length drive shaft support, as pointed out above, reduces vibration in the drive shaft and adjacent gearset and substantially allows modifications that will increase the capacity of the stern drive unit. Payne, on the other hand, simply discusses facilitating replacement of worn ball bearings or the support member from the housing of such a unit.

15 Claim 4 has been rejected under 35 U.S.C. §103(a) over Mixer in view of Metzger. Again, Applicants point out that both of these patents relate to pipe fittings or plumbing fixtures and would in no way be suggestive of the stern drive shaft support of the Applicants. Further, it is emphasized that Claim 4 is a dependent claim and is believed allowable for the reasons set forth above. Applicants submit that a combination

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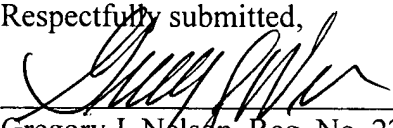
of the cited references would basically result in a pipe fitting and such a combined structure would not disclose nor teach the advantages or the benefit of the claimed invention.

In view of the foregoing, it is believed that the claims, as presented herewith,
5 clearly define patentable subject matter.

A favorable action is respectfully solicited.

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Respectfully submitted,


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